

LCAC FLEET SUPPORT CONFERENCE NAVSEA Philadelphia Overview Gas Turbine Support

5-7 OCT 2004

ACU-5

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GAS TURBINE SECTION

Technical POCs

LCAC FSC 24

OCT 5-7,
2004

ACU-5

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- **R&M DATA & DEPOT ENGR:** DAYTON
WU SON

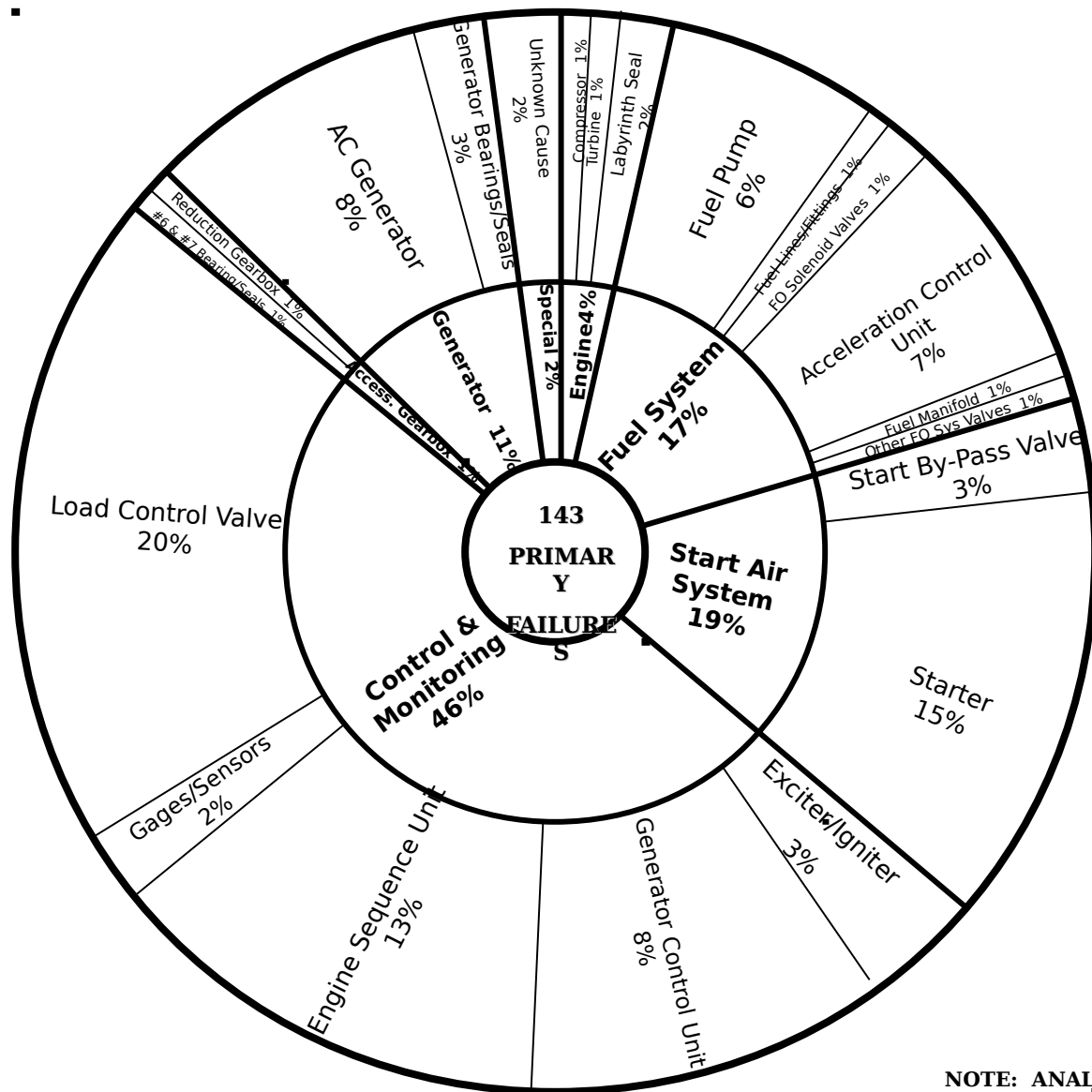
GAS TURBINE SECTION

T-62 R&M Data Review

LCAC FSC 24

OCT 5-7,
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ACU-5



TOP FAILURE ITEMS

Load Control Valve
20%

Starter
15%

Engine Sequence Unit
13%

Generator Control Unit
8%

AC Generator
8%

Acceleration Control Unit
7%

Fuel Pump
6%

Start Bypass Valve
3%

Generator Bearing/Seals
3%

NOTE: ANALYSIS BASED ON 3/4/16/03 THRU 4/15/04
ASSESSMENT PERIOD

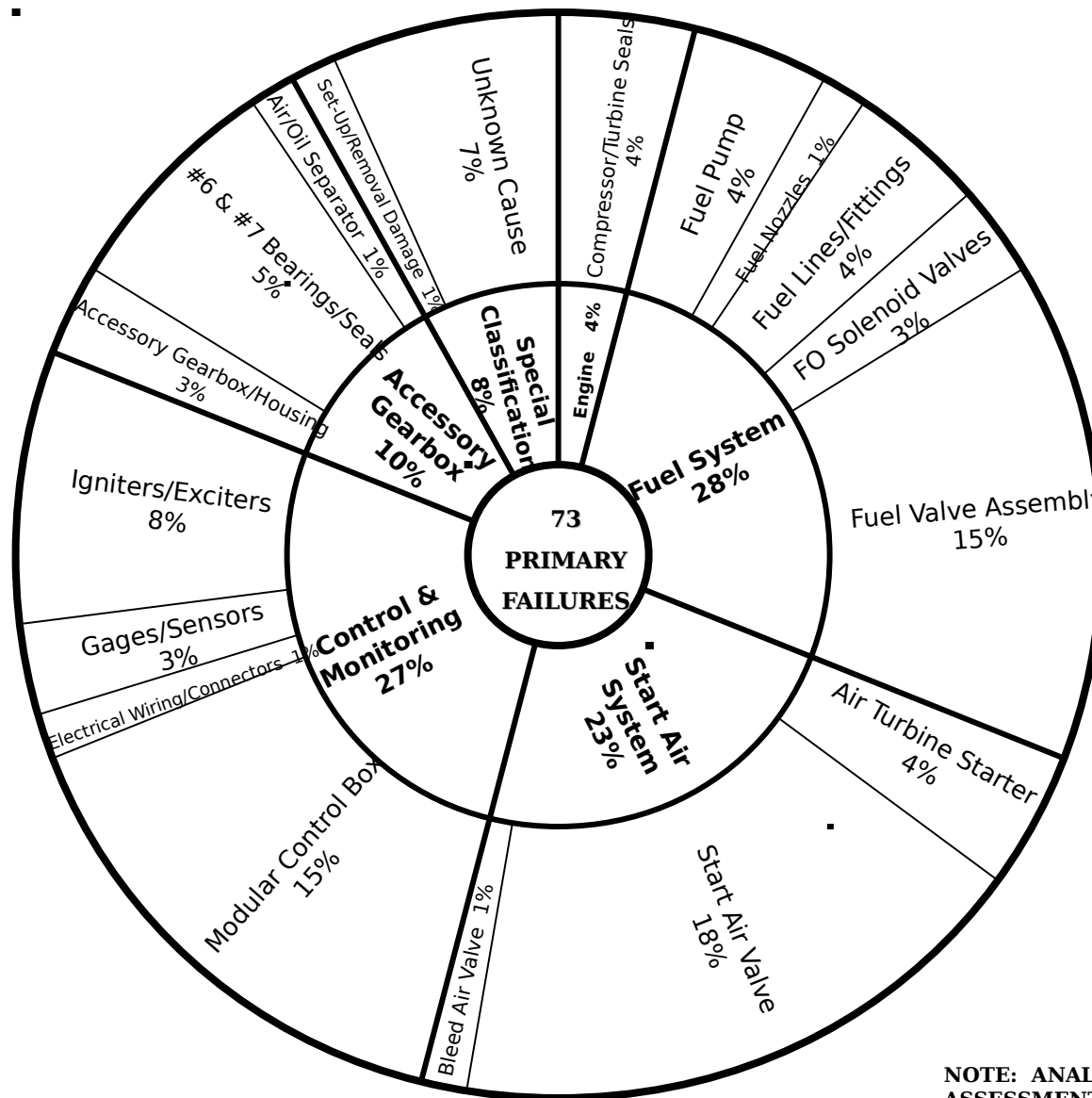
GAS TURBINE SECTION

TF40B R&M Data Review

LCAC FSC 24

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TOP FAILURE ITEMS

Start Air Valve
18%

Modular Control Box
15%

Fuel Valve Assembly
15%

Igniters/Exciters
8%

Unknown Cause
7%

#6 & #7 Bearings and Seals
5%

Compressor/Turbine Seals
4%

Air Turbine Starter
4%

Fuel Pump
4%

Fuel Lines/Fittings
4%

Fuel Nozzles
1%

FO Solenoid Valves
3%

Accessory Gearbox/Housing
3%

Gages/Sensors
3%

Electrical Wiring/Connectors
1%

Bleed Air Valve
1%

Air/Oil Separator
1%

Set-Up/Removal Damage
1%

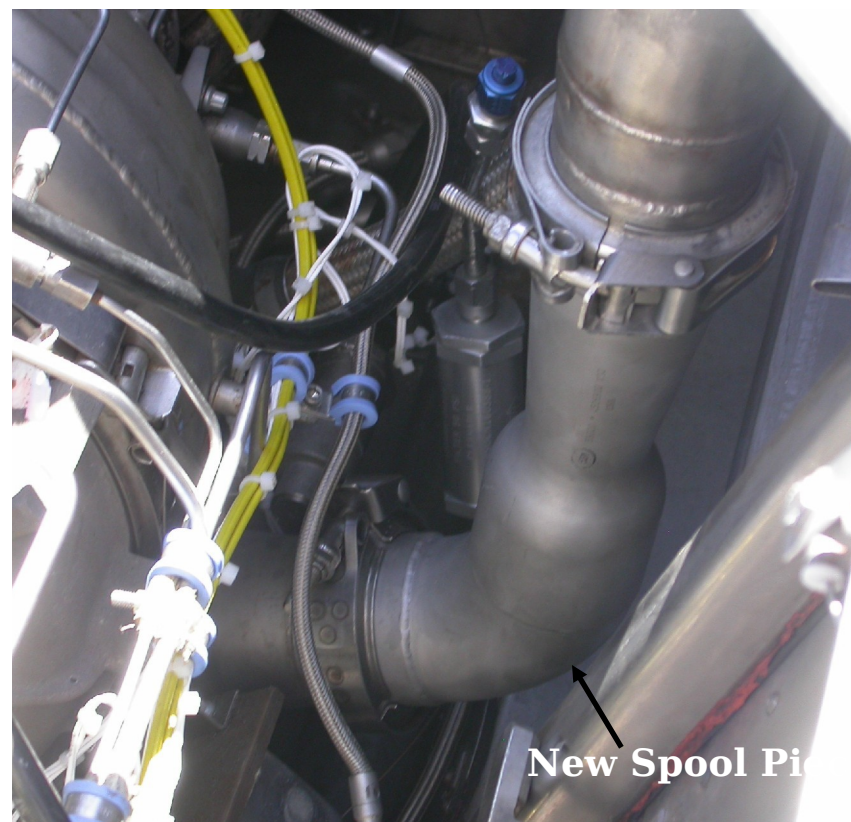
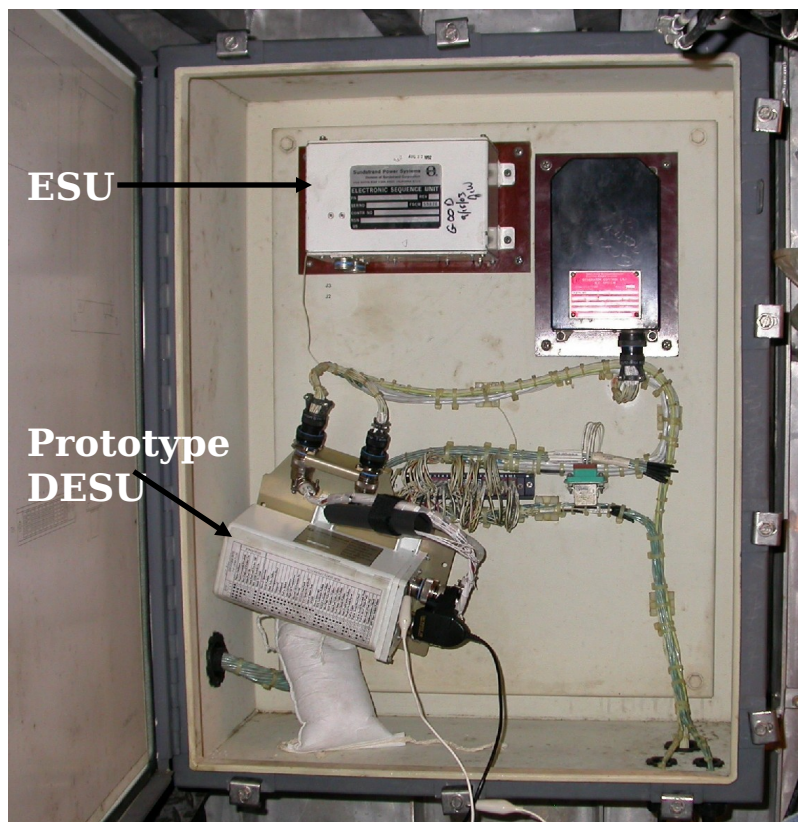
NOTE: ANALYSIS BASED ON
ASSESSMENT PERIOD

• LCAC PROGRAM MEETINGS & ISEA SITE VISITS

- Visits to ACU-4,5
- LCAC, PMS 377 life cycle review
- SEAOPS, SURFMER, TSR reviews
- LCAC propulsion & power workshops at ACU 4,5
 - Next workshop planned: 19-20 Jan 2005 at ACU-5

• T62

- Installed digital ESU & demonstrated OPS w/out load control valve
- Successful OPS w/DESU on LC 42
- Fixed orifice spool piece in place on LC 42 & 91 for OPEVAL



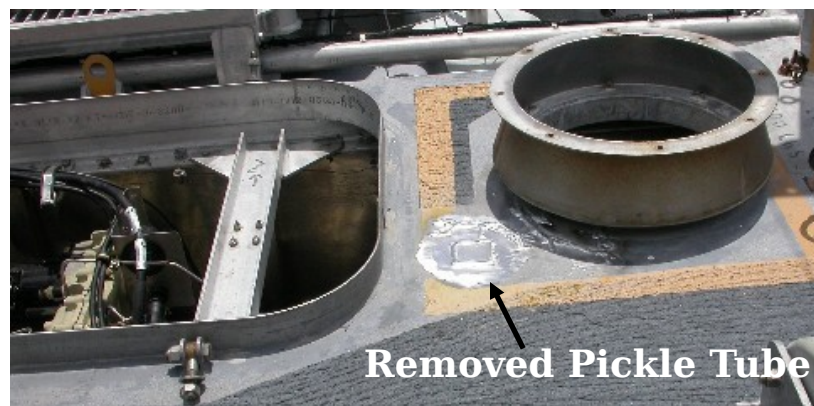
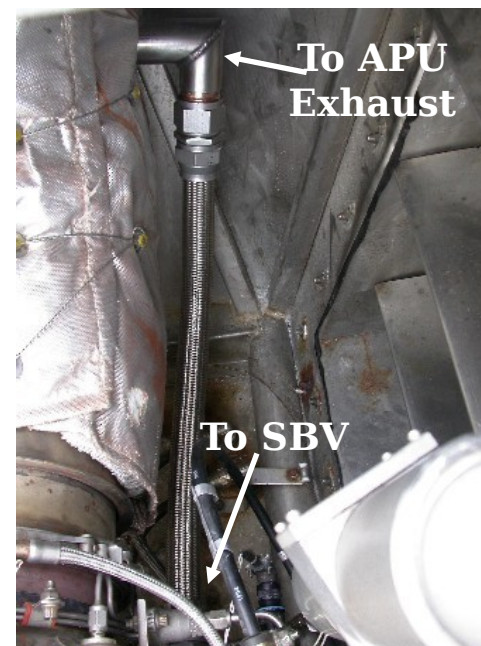
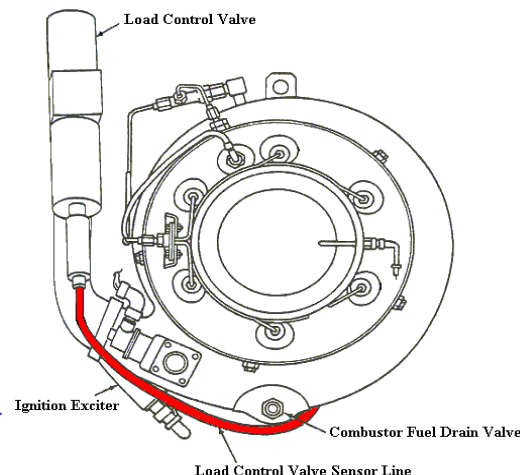
• T62

- Approved ECP to change LCV sensor line

- GTC 4 listed at

<https://mgt.navsses.navy.mil/T62/gtc.a>

- Installed start bypass valve exhaust relocation prototype on LC 91





GAS TURBINE SECTION

Life Cycle Support Highlights of FY04

LCAC FSC 24

**OCT 5-7,
2004**

- **TF40B**

- **Water wash system mod OPEVAL on LC 48 - satisfied w/OPS**

- Developed plan to implement in fleet via craft alt with PUBO
 - Final report detailing new system to be issued to PUBO Oct 04

- **Hot Section Inspection**

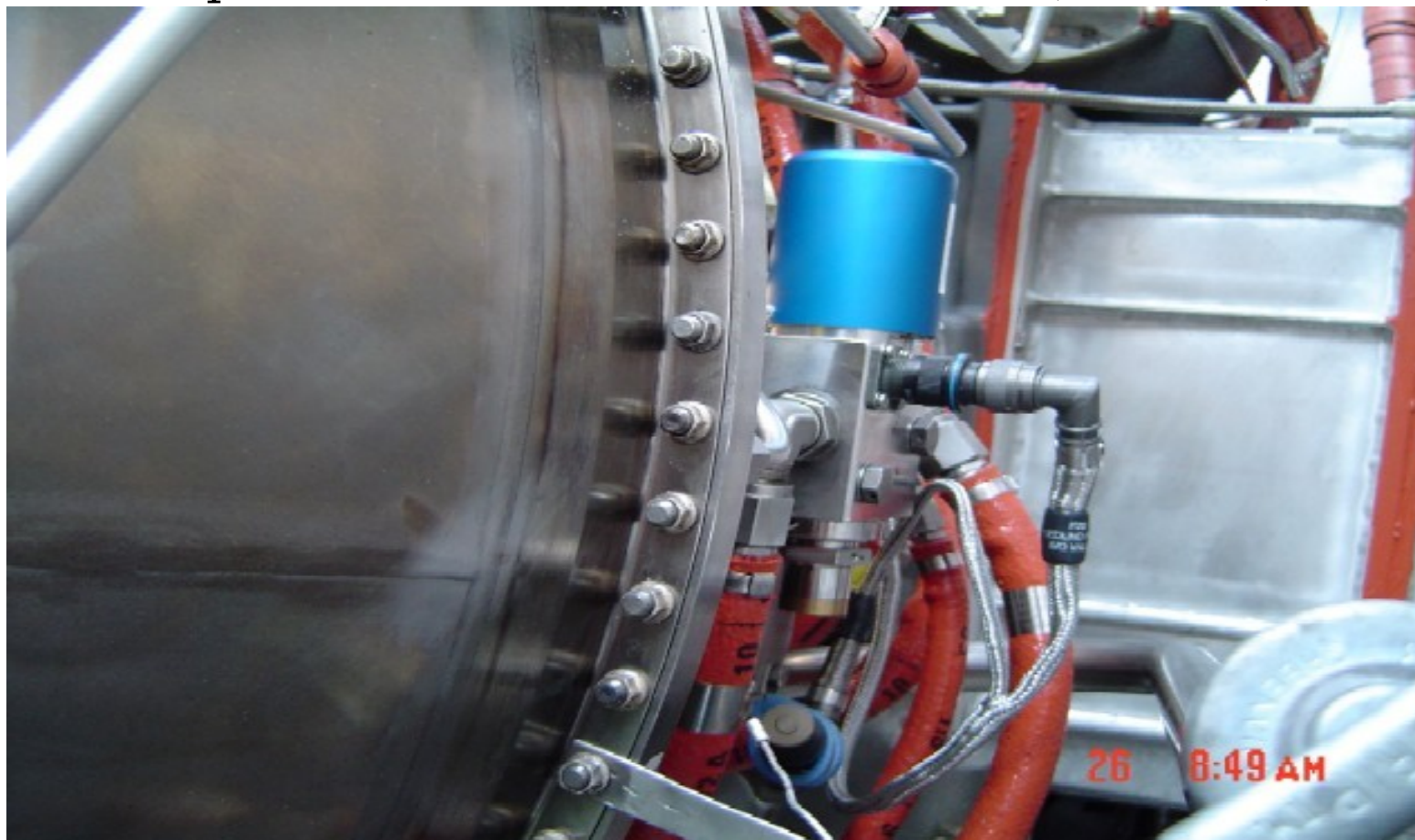
- GTB 4 R3 issued 14 Apr 04;
<https://mgt.navsses.navy.mil/TF40B/gtb.asp>
 - Decreased requirement for 1st inspection from 1500 to 1000 hours
 - Added procedure to turn in/replace fuel manifolds
 - NAVAL message in chop to provide fleet interim relief for non-deploying craft on this requirement

- **Harness Bracket Re-Designed - ECP & KIT Planned in FY05**

- **SLEP**

- Provided on-site support at ACU-5 during ETF40B engine bearing failure investigations Oct 03 thru Dec 03
 - Developed output group inspection and repair procedure and qualified 2 vendors
- Completed major revision of ETF40B 04 & 06 level tech manuals
 - Incorporated lessons learned from engine disassembly and re-assembly during ETF40B bearing failure investigations
- Completed hybrid engine TF40B/ETF40B test on LC 91
- FADEC firmware upgrade - lead/lag changes for TF40B OPS incorporated
- FADEC environmental stress screening testing 100% completed
- Supported sprag clutch testing on LC 91

- **SLEP**
 - Completed fuel solenoid shutoff valve (Marotta) re-



- **DEPOT**

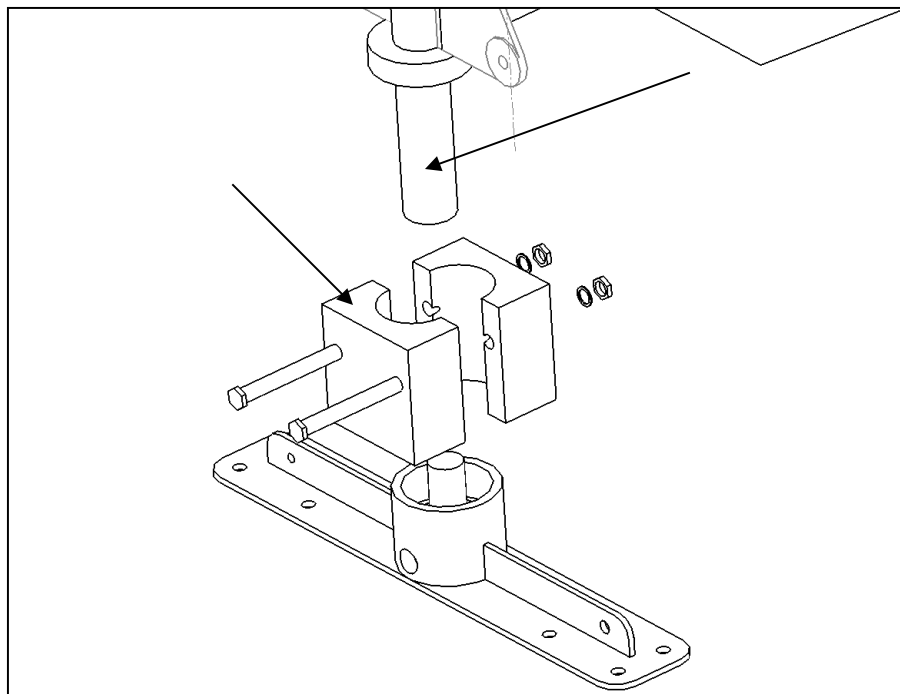
- Satisfied demand for PUKs to support craft deployment while maintaining ETF40B throughput
- Solicited alternative facilities to perform TF40B depot repair
- Achieved cost reduction for T-62 depot repairs at Cherry Point

- **COMPONENT REPAIRS AND RE-USE**

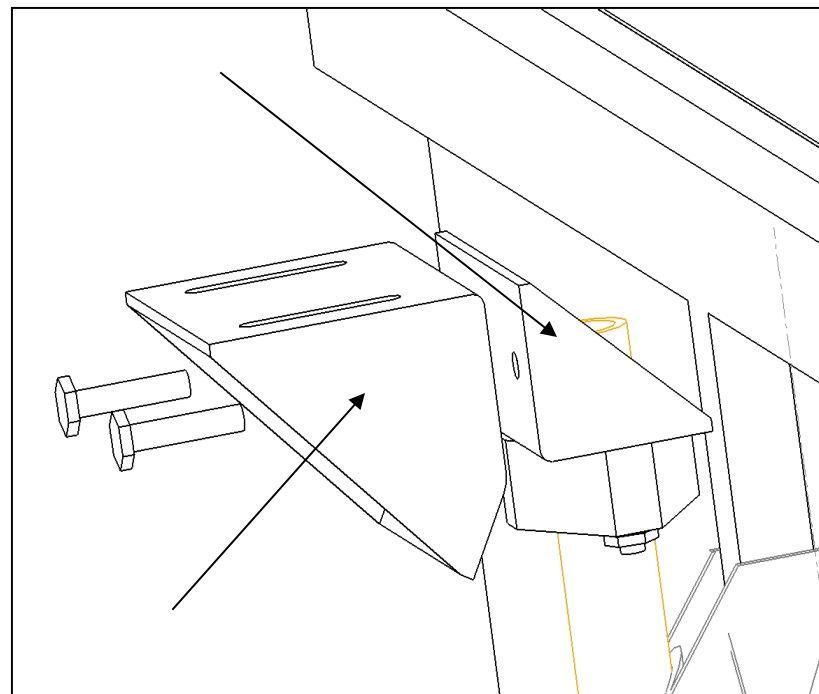
- Exhaust collector repair procedure – AER 499 approved
- Exhaust collector monoball bearing re-design – draft AER 505 completed
 - Drawing on next slide
- Advanced turbine services (ATS) on-line inventory of re-use parts
- ATS certified for repair of:
 - Output groups, bleed valves, fuel valve assembly, fuel

MONOBALL BEARING RE- DESIGN

**Collector Pin, Lower
Bracket and Spacer Block
Exploded**



**Complete Bracket Assembly
(craft frame, washers and
nuts not shown)**





- **IMPROVED ENGINE TRACKING & METRICS**

- **Engine s/n database - Dayton Wilson - single POC**

- Resolution of s/n discrepancies being worked in conjunction with ACU reps, NAVICP, and NSWC PHIL. Expect to clear all discrepancies by 1 Nov 04

- **AUTOLOG usage - Onsite training provided @ ACU-4 & 5**

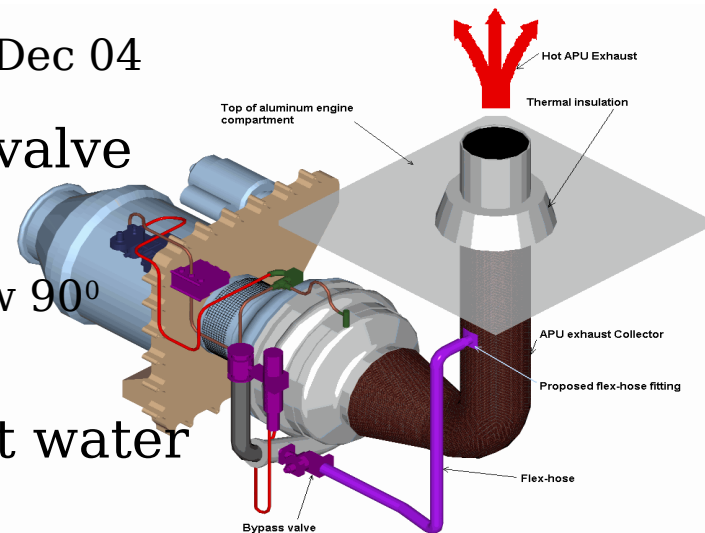
- 76% craft at ACU-5 sent updates
- 31% craft at ACU-4 sent updates

- **OVERALL TF40B & T-62 ENGINE AVAILABILITY(Ao) UNCHANGED**

- T-62 MTBF (226 hrs) Trend: +
- TF40B MTBF (336 hrs) Trend: +

• T62

- Issue ECP for fixed orifice spool piece
- Issue ECP for digital ESU
- Evaluate new “high reliability” wiring harness
- Delivery of first prototype scheduled for Dec 04
- Issue ECP to re-locate start bypass valve exhaust
 - Plan additional prototype install with new 90° swivel hose fitting, LCAC TBD
- Design CDP manifold to prevent salt water contamination of accel control unit
 - Plan to install prototype 2nd Qtr FY05



- **T62**

- **APU/ESU Tester Upgrades (Sytronics)**

- Fund development of new software mod and ESU extender card

- **ESU Repairs**

- Reviewed/approved OEM proposal to NAVICP for repair of 25 F-condition ESUs
 - ECD for completion of 1st unit is Jul 05

- **Memory Cards**

- Identified alternate vendor to supply A2 cards
 - Fund fabrication of 1st article prototype for testing
 - Prototype card ECD Dec 04

- **E/TF40B**

- Finalize water wash system configuration change
- Complete fuel solenoid shutoff valve (Marotta) ECP
 - TF40B and ETF40Bs in fleet will be replaced by attrition
 - New ETF40Bs to come with new valve, pending approval of ECP
- Develop nozzle tester stand for ACUs

- **SLEP**

- Continue investigation of permanently installed torque meter
- Develop hybrid engine TF40B/ETF40B kit and instruction
- Develop adapter for using engine tester on ETF40B
- Perform TF40B/ETF40B engine changeout on LC 02
- Support SLEP physical configuration audits on LC 25 & LC 02
- Support of SLEP combined trials for LC 4 in Nov 04



GAS TURBINE SECTION

Objectives of FY05

LCAC FSC 24

OCT 5-7,
2004

ACU-5

- **SLEP**

- Test performance of BAAS on LC 25

- **DEPOT REPAIR SUPPORT**

- Evaluate/verify assembly, test & repair capabilities of Standard Aero
 - Ensure assets available to maintain demand IAW NAVSEA Inst 4442.1B & CONOPS

- **COMPONENT REPAIRS AND RE-USE**

- Certifications planned for FY05:
 - Alternate vendor for A2 card in ESU

- **WEB-LOG (internet based AUTOLOG)**

- Demonstration planned for Dec 04

- **Two TF40B PPGs repaired by Vericor at Honeywell Greer in FY04**

- PPG average cost was \$548.5K
- Turbine then compressor blades highest cost drivers

- **TF40B parts reclamation saved \$70K of FY04 depot costs**

- Provided compressors and turbine parts as GFM to depot

- **Sixteen T62-APUs repaired at Cherry Point in FY04**

- Current fixed repair price is \$39.4K per APU

- **ACUs were each funded \$195K for depot avoidance repairs**

- Estimated 8 PPG and 9 APUs (> \$1.5M Savings)
- Other minor repairs of PPGs were accomplished